DAP-IM / REP-IM

PERMANENT INSULATION DETECTION UNIT
REPEATING UNIT

USER MANUAL

DETECTOR DE AISLAMIENTO PERMANENTE

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DAP-IM TECHNICAL CHARACTERISTICS

Internal:

- 1 Potentiometer for KΩ of insulation alarm between L1, L2 and earth.
- 1 Switch for the transformer current scale background.
- 1 Communication port for connecting with the REP – IM repeater.
- An 8 led bar to indicate insulation resistance in KΩ.
- An 8-led bar to indicate the insulation transformer charge in %A.
- 4 functioning signalling LEDs.
- 1 «TEST» key.

Measurement/Detection Parameters:

- Insulation resistance:
  Measurement rank in KΩ ..... 50 KΩ to 1000 KΩ
- Insulation transformer current:
  Measurement rank in A ..... 10 A to 50 A
  Viewing of charge %A ..... 20% to 100%
- Insulation detection
- Transformer overload detection.
- Overheating detection by a PTC or FT.
- Earth continuity detection.

Inputs/Outputs:

- 2 NA relay outlets 10A, 250V
- Measurement transformer input..... 1000 coils
- PTC or FT input for measuring temperature.
- Communication channel ..... optoinsulated
- Supply outlet REP – IM module..... 12VAC.

Electrical and Environmental:

- Supply voltage .....230 VAC +/- 20%, 50 - 60Hz
- Consumption at 230 VAC .....9 VA.
- Impedance between phases and earth..... 400 KΩ
- Insulation voltage between phases and communications port.....2 KV
- Protection index IP21
- Working temperature .....-10ºC to 50ºC
- Storage temperature .....-55ºC to 125ºC
- Transport temperature .....-20ºC to 70ºC
- Relative humidity (without condensation) ... 0 to 95 %

Weight and Measurements:

- Weight .....480 gr
- Type of box .....6 track DIN Rail, DIN 43880
- Box measurements .....105 x 85 x 70 mm

REP – IM TECHNICAL CHARACTERISTICS

Internal:
- 1 Communication port for connecting with the DAP - IM.
- One 8-led bar for indicating insulation resistance.
- One 8-led bar for indicating the insulation transformer charge.
- 5 functioning signalling LEDs.
- 1 «Horn» key (Horn Stop).

Viewing/Detection Parameters:
- Insulation resistance:
  Viewing rank in KΩ .... 50 KΩ to 1000 KΩ
- Insulation transformer current:
  Charge viewing in %A ..... 20% to 100%
- Insulation detection.
- Transformer overload detection.
- Overheating detection.
- Earth continuity detection.

Electrical and Environmental:
- Supply voltage .... 12 VAC
- Functioning temperature ..... 10ºC to 50ºC
- Storage temperature ..... -55ºC to 125ºC
- Transport temperature ..... -20ºC to 70ºC
- Relative humidity (without condensation) ... 0 to 95 %
- Type of connection cable ..... 2 pairs min. plated or with mesh of 0.25 or 0.50 section

Weight and Measurements:
- Weight ..... 180 gr
- Measurements ..... DIN Box of 116.9 x 116.9 mm
- Frontal depth ..... 3 mm
- Minimum panel depth ..... 45 mm
- Dimensions for embedding repeater ..... 108 x 108 mm

SAFETY WARNINGS

WARNING: The symbol indicates that there is risk to the user, so the manual should be consulted for information on the part indicated.

Any use of the unit in a manner not specified by the manufacturer may compromise the safety of the unit and affect the user's protection.

Handling or installation of the unit must be carried out with it disconnected from the mains.

STORAGE AND INSTALLATION

It is recommended to store the unit in its respective packing boxes and taking into consideration a minimum of climatic conditions as indicated in the technical characteristics.

The DAP-IM does not have a switch or a fuse, so a switch or thermomagnet must be installed leaving a distance of over 3mm between open contacts.

No prior building work is required for installation. All that is needed is the appropriate drill hole in the cupboard housing the unit.

The place where the unit is located must observe the minimum dimensions to allow ventilation and connection of the input/output leads of the unit.

It is recommended to use lead with a maximum section of 2mm for connecting to the unit terminals.

The leads connected in the unit terminals must be held together using a nylon or similar flange, in such a way that if any lead comes loose from a terminal it will not cause accidental contacts with mass or other units.

MAINTENANCE

The DAP - IM does not require any type of special maintenance.

When carrying out revisions, the points to check are:

- A unit check can be done by carrying out a Trial Test.
- Check the condition of the leads, riveted terminals and tightness of the terminals.

To clean the front you should use a slightly dampened cloth (not wet) with water and neutral soap. Do not use an abrasive cleaning agent.

DESCRIPTION OF THE UNITS

*** DAP - IM**

The DAP-IM is a protection unit for insulated supply systems in hospitals that measures the following parameters:

- Measuring insulation resistance between lines L1, L2 and earth. This resistance will be seen on an 8-LED indicator bar.
- Detecting earth continuity.
- Measuring insulation transformer charge. This current is seen, as a percentage on the scale background, on an 8-LED indicator bar.
- Detecting overheating in the insulation transformer.

*** REP - IM**

The REP-IM repeater is a unit designed for working with one single DAP-IM to carry out all the functions by remote control. Communication will be performed through two wires.

It has two LED bars to indicate the level of insulation resistance and the level of insulation transformer charge, as well as indication LEDS for alarms, horn and horn stop key.

DESCRIPTION FUNCTIONING OF DAP – IM

The DAP - IM is a unit that supervises the insulation resistance between any of the input phases and earth, earth continuity, transformer temperature and the insulation transformer charge. Supply to the unit will be done through the same terminals by which insulation measurement is performed.

The user will programme a leakage current setting and an insulation resistance setting with the corresponding potentiometer and switch in the unit, which will be used by it for comparison with the instantaneous value that it will be measuring, and in the event that the value measured exceeds this limit, it will show an alarm.

ALARM INDICATION

The DAP - IM indicates the following types of alarm:

- Insulation leakage detection depending on the programmed setting.
- Insulation transformer charge detection depending on the programmed setting.
- No-earth detection (This alarm has priority over the others).
- Detection of overheating in the insulation transformer.

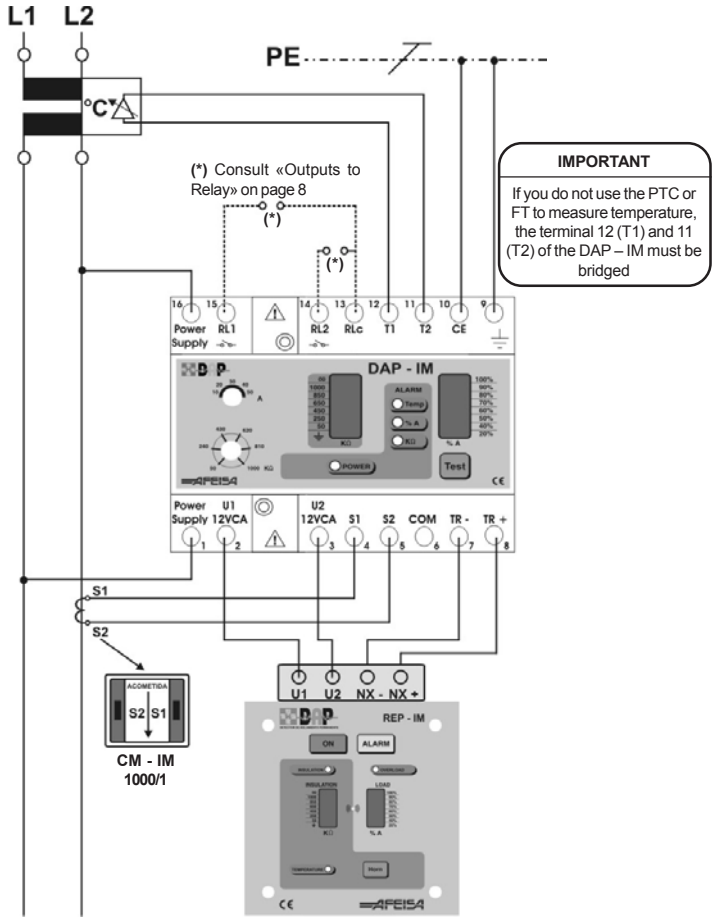
In the case of **«Insulation Leakage Detection»** an acoustic alarm is set off in the REP – IM (horn), a luminous one in the DAP - IM and REP-IM (fixed led « KΩ» in the DAP - IM and fixed led «Insulation» and «Alarm» in the REP - IM) and outlets to relay «RL1» and «RL2» will be activated in the DAP - IM.The acoustic alarm can be turned off pressing the «Horn» key in the REP – IM repeater (The beep indicator will reconnect according to the time configured in the REP . IM).

In the case of **«Insulation transformer charge detection»** an acoustic alarm is set off in the REP - IM (horn), a luminous one in the DAP - IM and REP - IM (fixed led «%A?» in the DAP - IM and fixed led «Overload» and «Alarm» in the REP - IM) and outlet to relay «RL2» will be activated in the DAP - IM. The acoustic alarm can be turned off pressing the «Horn» key in the REP – IM repeater (The beep indicator will reconnect according to the time configured in the REP .IM).

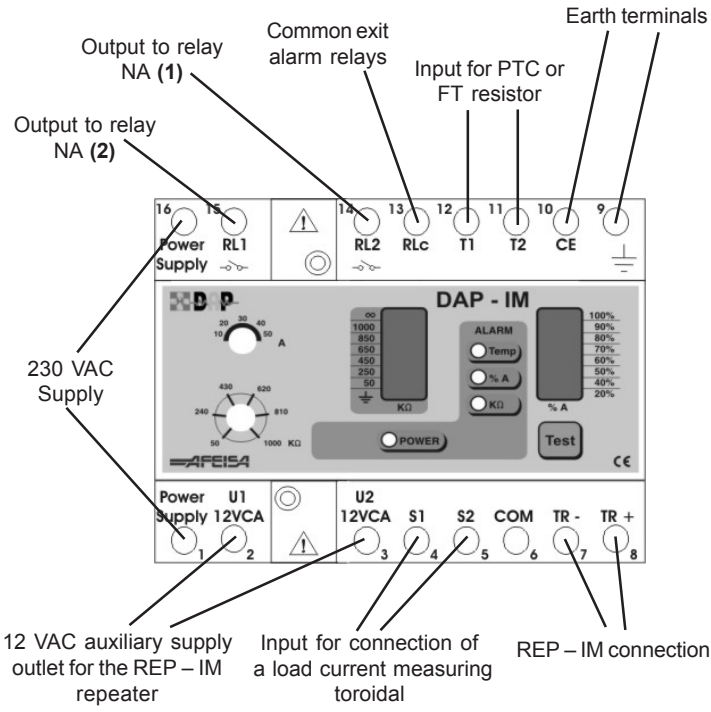
In the case of **«Detection of overheating in the insulation transformer»** an acoustic alarm is set off in the REP - IM (horn), a luminous one in the DAP - IM and REP - IM (fixed led «Temp» in the DAP - IM and fixed «Temperature» and «Alarm» in the REP - IM) and the outlet to relay «RL2» will be activated in the DAP - IM.
The acoustic alarm can be turned off pressing the «Horn» key in the REP – IM repeater (The beep indicator will reconnect according to the time configured in the REP . IM).

In the case of **«No-earth detection»** an acoustic alarm is set off in the REP - IM (horn), a luminous one in the DAP - IM and REP - IM (flashing led « KΩ» in the DAP - IM and flashing led «Alarm» in the REP - IM) and outlet to relay «RL2» will be activated in the DAP - IM. The acoustic alarm cannot be turned off even if the «Horn» key is pressed in the REP – IM repeater.

CONNECTING DAP - IM WITH A REP - IM



IDENTIFICATION DAP – IM TERMINALS



OUTLETS TO RELAY

(1) Outlet to relay normally open that closes when an alarm is set off due to a fault in the insulation resistance, transformer overloading, no-earth detection or overheating.

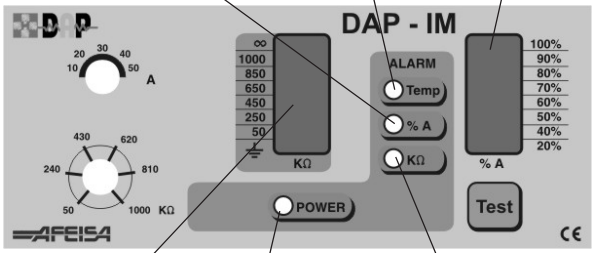
(2) Outlet to relay normally open that closes when an alarm is set off due to a fault in the insulation resistance.

FUNCTIONING OF DAP – IM LEDS

This indicates that a temperature alarm has been set off. Fixed yellow.

This indicates that an insulation transformer load alarm has been set off in %A. Fixed yellow.

This indicates that the LED lit up on the bar is greater than or equal to the %A of the value shown. Fixed red.



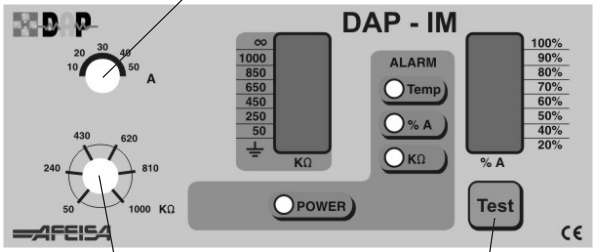
This indicates that the LED lit up on the bar is greater than or equal to the KΩ of the value shown. Fixed red.

This indicates that a KΩ insulation resistance alarm has been set off (fixed yellow) or due to breakage in earth continuity (flashing yellow).

It indicates that the unit is on. Fixed green.

FUNCTIONING OF THE DAP – IM KEYBOARD

INSULATION TRANSFORMER LOAD SWITCH
Switch for setting the maximum value of the insulation transformer current.



TEST
When this key is pressed, a test of the unit's measuring systems is carried out.

INSULATION RESISTANCE POTENTIOMETER
Potentiometer for setting the maximum resistance value between L1 L2 and earth.

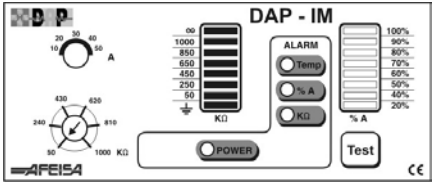
HOW TO CONFIGURE THE DAP - IM

Configuration of the DAP-IM is done through its own keyboard and allows the following parameters to be configured: The communication mode (by manufacturing default the DAP – IM is configured for connecting with a REP – IM repeater) and the alarm setting of insulation resistance. Said setting can be programmed by the potentiometer or through the « KΩ» leds bar of the unit if you wish to adjust it more accurately. (To do so, follow the steps indicated below in this chapter for configuring the insulation resistance alarm setting).

To enter unit configuration, the current should be turned on to the unit by pressing the **«TEST»** key for 5 seconds, after which all the DAP-IM alarm leds will flash.

In the first place, the DAP- IM must be configured with connection to a REP –IM repeater (**«Communications mode»**):

Select the 50 KΩ value on the insulation resistance potentiometer to configure the DAP- IM communications with a REP- IM repeater (It will be indicated by viewing the 8 leds of the insulation resistance indicator bar).



Once **«communications mode»** has been selected, press the **«TEST»** button to validate.

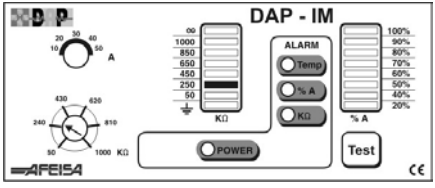
Then you must configure **«insulation resistance alarm setting»** (The «KΩ» led of the DAP - IM will flash):

Through the insulation resistance potentiometer, select the alarm setting value; the leds bar will graphically indicate the position of the switch.

HOW TO CONFIGURE THE DAP - IM

Once the desired value has been selected, press the **«TEST»** button to validate.

The unit will record the new configuration in its EEPROM memory and will start working in normal mode.



NOTE:

In the event that the DAP - IM is on for more than 60 seconds without the **«TEST»** key being pressed, it will go out of configuration mode and go back to normal working. When you go out of configuration of the unit, the parameters that have been modified will not be recorded, so it will go back to having the previous values.

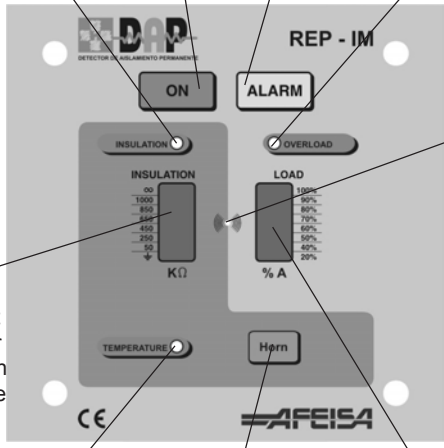
FUNCTIONING OF REP – IM LEDS

It indicates that the unit is connected. Fixed green.

It indicates that there is an alarm (fixed yellow) and if earth continuity is broken (flashing yellow).

It indicates that an insulation resistance alarm has occurred. Fixed yellow.

It indicates that a transformer charge alarm has occurred. Fixed yellow.



Horn.

It indicates that the led lit up on the bar is greater than or equal to the KΩ of the value indicated. Fixed red.

This key for the horn.

It indicates that an alarm for temperature has occurred. Fixed yellow.

It indicates that the led lit up on the bar is greater than or equal to the %A of the value indicated. Fixed red.

HOW TO CONFIGURE THE REP - IM

The REP - IM has three dips (JP1, JP2 and JP3) to configure the reconnection time of the beep indicator if an alarm persists (Depending on the bridges connected). See «TABLE - 1».

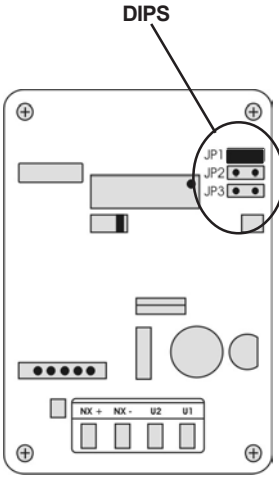


TABLE - 1

Time Reconnection	DIPS		
	JP1	JP2	JP3
Without reconnection	NO	NO	NO
5 minutes	YES	NO	NO
10 minutes	NO	YES	NO
15 minutes	YES	YES	NO
20 minutes	NO	NO	YES
25 minutes	YES	NO	YES
30 minutes	NO	SI	YES
35 minutes	YES	YES	YES

The manufactured unit comes with all the bridges connected in the DIPS, therefore the sound reconnection time if an alarm persists will occur in 35 minutes.

If there is no bridge connected, once the horn has been stopped by the unit key, it does not reconnect.

TRIAL TEST DAP – IM

If we press the **«TEST»** key of the DAP - IM for more than 3 seconds, we will carry out a system test. This test will cause:

- An equivalent leak greater than 45 KΩ without this affecting impedance of the system to earth.
- Intensity greater than 100% of the selected setting.
- A temperature alarm through disconnection of the PTC or FT.
- A sound alarm.

Once we stop pressing the «TEST» key, the trial «Test» in the unit will automatically finish and will return to normal working.

NOTE: If the system is working correcting, all the alarm leds of the DAP – IM and REP – IM will light up and the acoustic alarm will be set ; off in the REP – IM repeater.

DIAGNOSIS OF ERRORS AND FAULTS

THE POWER LED ON THE DAP – IM DOES NOT LIGHT UP	**Check that the unit is correctly supplied in terminals 1 and 16**.
THE UNIT KEEPS RESETTING	**The supply current may be too low**.
THE DAP – IM DOES NOT COMMUNICATE OR DOES NOT WORK CORRECTLY WITH THE REP – IM	**Review the wiring of the repeater used** **Check the communication configuration in the DAP – IM**.
TEMPERATURE ALARM ALWAYS ACTIVE	**Check the connection of the PTC or FT of the insulation transformer.** **Check the real temperature of the transformer** **In the event of not using the PTC or FT bridge terminals 12 (T1) and 11 (T2) of the DAP - IM**.

In the event of failure or breakdown, the unit should be sent to your distributor or directly to AFEI Sistemas y Automatización, S.A. for it to be repaired by the technical service.

SAFETY SETTINGS

This unit is designed according to standards IEC 61557-8, IEC 60364-7-710, EN60601-1, EN60601-1-1, EN60601-1-2 (it includes EN 55011 and EN 61000-4-2 , EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5), EN 60601-1-4 and is supplied in good condition.

The proper, safe functioning of the product implies that transport, installation and assembly are in accordance with the standards described in this User Manual.

The unit does not have a fuse. Therefore, appropriate protection elements must be provided.

It is necessary to take precautions to increase safety, for example:

- The functions not relevant for safety of the installation are controlled electronically.
- The functions that on failing can cause considerable material or even personal damage, are performed using conventional (electro-mechanical) control elements.

These considerations are independent of the type, manufacturer and country of origin.

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